SONGINA, O.A.

Oxidation-reduction reactions in amperometric (polarometric) titration.
Izv. AN Kazakh. SSR.Ser. khim. no.1:86-93 '60. (MIRA 13:11)
(Oxidation-reduction reaction) (Conductometric analysis)

ROZHDESTVENSKAYA, Z.B.; SONGINA, O.A.

Polarographic reduction of halogenates and their oxidation potentials.
Zhur.anal.khim. 15 no.2:138-146 Mr-Ap '60. (MIRA 13:7)

1. Kazakhskiy gosudarstvennyy universitet, Alma-Ata.
(Halates)

SONGINA, O. A.

Some characteristics of polarometric titration with a rotating platinum electrode. Coll Cz Chem 25 no.12:3179-3187 D '60. (EEAI 10:9)

1. Kazakhskiy gosudarstvenniy universitet im. S. M. Kirova, Alma-Ata, SSSR.

(Polarograph and polarography) (Electrodes) (Platinum)

SAVITSKAYA, I.S.; SONGINA, O.A.

Amperometric titration with two indicator electrodes (dead stop end point); survey. Zav.lab. 26 no.3:282-287 '60. (MIRA 13:6)
(Conductometric analysis)

ZAKHAROV, V.A., SONGINA, O.A., DRAGAVTSEVA, N.A.

Amperometric determination of arsenic and antimony. Zav.lab. 26 no.5:537-540 '60. (MIRA 13:7)

1. Kazakhskiy gosudarstvennyy universitet.
(Arsenic--Analysis) (Antimony--Analysis)

ZAKHAROV, V.A., SONGINA, O.A., TERZEMAN, L.N.

Amperometric method of determining mercury on a rotating plaitnum electrode. Zav.lab. 26 no.7:787-792 '60.
(MIRA 13:7)

1. Kazakhskiy gosudarstvennyy universitet im S.M. Kirova.
(Mercury--Analysis) (Electrodes, Platinum)

STUDENSKAYA, L.S.; SOKOLINA, O.A.

Determination of vanadium in steel and ferroalloys by amperometric titration with two indicator electrodes. Zav.lab 26 no.10:1102-1104 '60. (MIRA 13:10)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov i Kazakhskiy gosudarstvennyy universitet.
(Vanadium--Analysis) (Steel--Analysis) (Iron alloys)

SONGINA, O.A.; ZAKHAROV, V.A.

Some particular features of amperometric (polarimetric) titration by means of a rotating platinum electrode. Izv.AN Kazakh. SSR. Ser.khim. no.1:52-59 '61. (MIRA 16:7)
(Conductometric analysis) (Electrodes, Platinum)

KUZ'MINA, N.N.; SONGINA, O.A.

Oxidation of thiourea on a rotating platinum anode. Izv.vys.ucheb. zav.; khim.i khim.tekh. 4 no.6:928-935 '61. (MIRA 15:3)

1. Kuybyshevskiy industrial'nyy institut imeni V.V.Kuybysheva i Kazakhskiy gosudarstvennyy universitet imeni Kirova.
(Urea) (Oxidation) (Electrodes, Platinum)

SONGINA, O.A.; KHODASEVICH, S.A.

Part played by Zimmerman-Reinhardt's solution in the permanganometric determination of iron. Zhur.anal.khim. 16 no.5:516-522 S-O '61. (MIRA 14:9)

1. Kazakh State University, Alma-Ata.
(Iron--Analysis)

SONGINA, O.A.; SAVITSKAYA, I.S.

Effect of the dimensions of cathode and anode on the shape of a curve in amperometric titration with two indicator electrodes. Zav.lab. 27 no.9:1068-1074 '61. (MIRA 14:9)

1. Kazakhskiy gosudarstvennyy universitet i Bashkirskiy gosudarstvennyy universitet.
(Conductometric analysis)

SOKOLOVA, O.A.; PAVLOVA, I.M.

Electrooxidation of a rhodanide ion on the platinum electrode. Izv.vys.uchob.zav.;khim i khim.tekh. 5 no.3:378-382 '62. (MIRA 15:7)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova, kafedra khimii redkikh elementov.
(Oxidation, Electrolytic) (Electrodes, Platinum)

KUZ'MINA, N.N.; SONGINA, O.A.

Amperometric determination of selenium in sulfur by means of thiourea. Zhur.anal.khim. 17 no.4:495-498 Jl '62. (MIRA 15:8)

1. V.V.Kuibyshev Industrial Institute, Kuibyshev and S.M.Kirov Kazakh State University, Alma-Ata.
(Selenium—Analysis) (Conductometric analysis)

SONGINA, O.A.; DAUSHEVA, M.R.; KHODASEVICH, S.A.

Amperometric titration of manganese with permangante in the presence of pyrophosphate. Zhur.anal.khim. 17 no.8:966-971 N '62. (MIRA 15:12)

1. S.M.Kirov Kazakh State University, Alma-Ata.
(Manganese--Ahalysis) (Conductometric analysis)

ZAKHAROV, V. A.; VOYLOSHNIKOVA, A. P.; SONGINA, O. A.

Amperometric determination of tri- and pentavalent arsenic in ores.
Zav.lab. 28 no.1:27-28 '62. (MIRA 15:2)

1. Kazakhskiy gosudarstvennyy universitet im. S. M. Kirova i Institut khimii AN Kazakhskoy SSR.
(Arsenic—Analysis)

SONGINA, O.A.; ZAKHAROV, V.A.

Shape of curves of the amperometric titration of mercury with potassium iodide as determined by the indicator electrode potential. Zav.lab. 28 no.8:908-910 '62. (MIRA 15:11)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova.
(Mercury--Analysis) (Conductometric analysis)

ZAKHAROV, V.A.; SONGINA O.A. (Alma-Ata)

Behavior of iodide and iodine on the pl num microelectrode.
Zhur. fiz. khim. 36 no.6:1226-1231 Je'62 (MIRA 17:7)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova.

SONGINA, O.A.; TOYBAYEV, B.K.

Reduction potentials of dissolved oxygen on a platinum electrode.
Izv.AN Kazakh. SSR. Ser.tekh.i khim.nauk no.1:8-10 '63.
(MIRA 17:3)

ROZHDESTVENSKAYA, Z.B.; GLADYSHEV, V.P.; SONGINA, O.A.

Oscillopolarographic investigation of the reduction of some oxygen-containing anions in sulfuric acid solutions. Izv. AN Kazakh. SSR. Ser. tekh. i khim. nauk no.2:8-14 '63. (MIRA 17:2)

L 11058-63 EWP(q)/EWT(m)/BDS—AFFTC/ASD/ESD-3—RM/JD
ACCESSION NR: AP3000479 S/0153/63/006/001/0163/0164

6D
59

AUTHOR: Nevzorov, A. N.; Songina, O. A.

TITLE: oxalate complex compounds of niobium (V) and tantalum (V)

SOURCE: Izv. VUZ: Khimiya i khim. tekhnologiya, v. 6, no. 1, 1963, 163-164

TOPIC TAGS: niobium oxalate complexes, tantalum oxalate complexes, K sub 3, NbO trioxalate, 2H sub 2 O, K sub 5, Nb oxalate sub 5

ABSTRACT: The authors investigate the composition, properties, and formation conditions different from those in previous studies for complex oxalate compounds of niobium and tantalum. The preparation method finally selected for the niobium oxalate complexes was as follows: dried niobium hydroxide was dissolved in hot concentrated oxalic acid solution. The solution was then neutralized with KOH to a pH of 3 to 3.5, during which time excess oxalate separated out as potassium bioxalate. The filtrate was evaporated to a niobium concentration of 100 to 120 gm/l and cooled to room temperature, whereupon a crystalline precipitate was obtained. Analysis of the mother liquor and of the precipitate showed a ratio of Nb to oxalate ion of 1:3. The precipitate composition corresponds to the formula K sub 3 [NbO trioxalate]. 2H sub 2 O. It loses one molecule of water at 100C, the other

Card 1/2

ACCESSION NR: AP3000479

at 140C, and decomposes at 220C with evolution of carbon dioxide. The solubility of the salt at 25C is 160 gm/l and at 100C - 1000 gm/l. Dissolving the precipitate in water increases the pH to 3.5 - 4.0 as a result of slight hydrolysis of the oxaniobate complex. By varying the pH it was determined that the potassium oxalic niobate was stable in the region of pH - 2.5 to 4.5 and crystalized out of any such solution by evaporation. The authors were unable to prepare a previously described K sub 5 complex [Nb oxalate sub 5]. A tantalum oxalate complex obtained by a similar process had a molecular ratio Ta: oxalate:K of 1:1:1. This compound is thought to correspond to either KTa(OH) sub 4 oxalate or KTaO sub 2 oxalate. It hydrolyzes in water, but readily dissolves in a solution of pH less than 3. Orig. art. has: 1 table.

ASSOCIATION: Kafedra khimii redkikh elementov, Kazakhskiy gosudarstvenny*y universitet im. S. M. Kirova (Department of Rare Element Chemistry, Kazakh State University)

SUBMITTED: 31Jan62 DATE ACQD: 21Jun63 ENCL: 00

SUB CODE: CH NO REF SOV: 002 OTHER: 003

Card 2/2

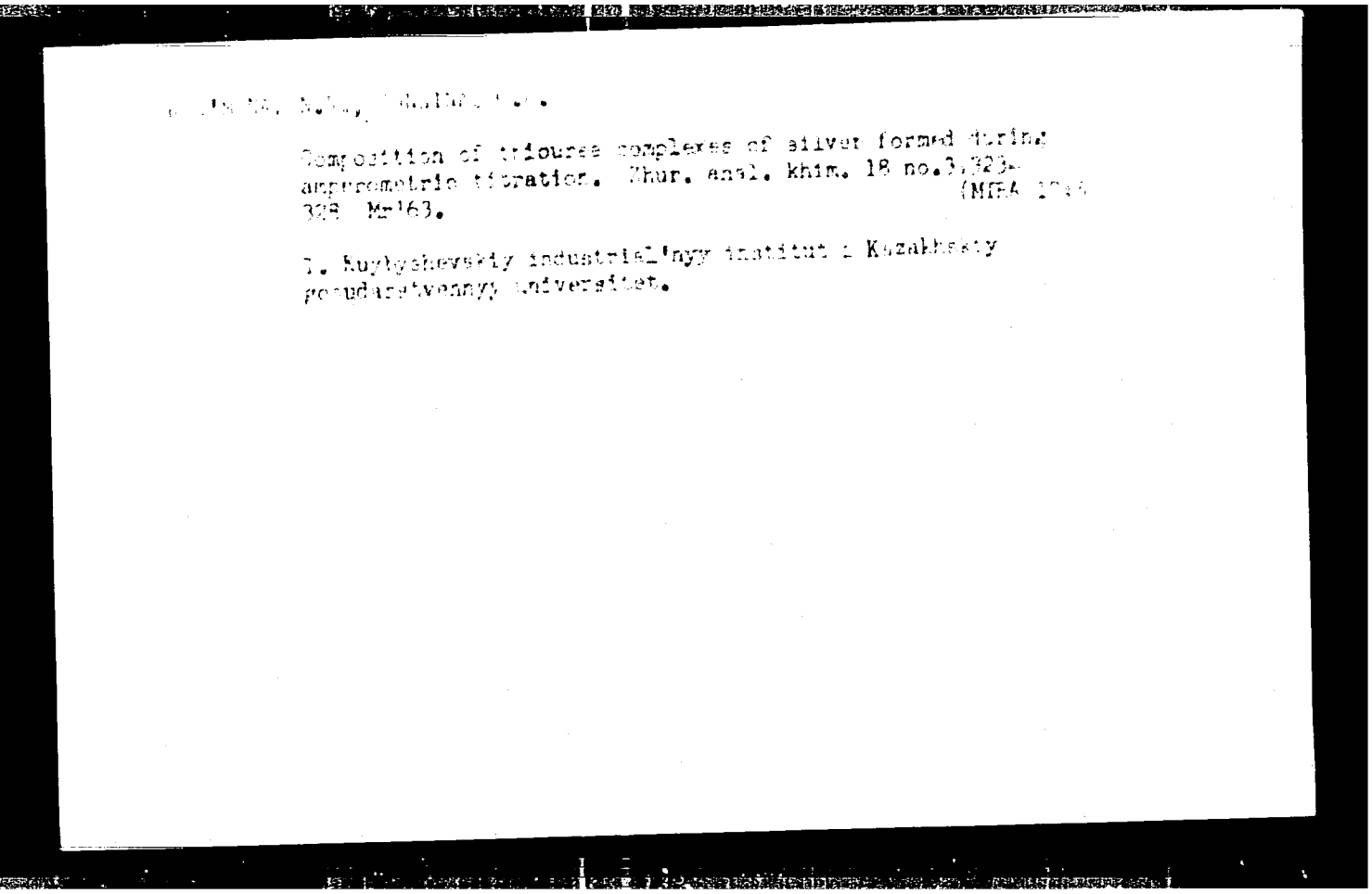
KUZ'MINA, N.N.; SONGINA, O.A.

Oxidation of sulfite, sulfide, and thiosulfate on a rotating platinum anode. Izv.vys.ucheb.zav.;khim. i khim.tekh. 6 no.2:201-203 '63. (MIRA 16:9)

1. Kuybyshevskiy industrial'nyy institut imeni V.V.Kuybysheva i Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova, kafedra analiticheskoy i fizicheskoy khimii.
(Sulfur compounds) (Oxidation, Electrolytic)

SONGINA, O.A.; ROZHDESTVENSKAYA, Z.B.

Article by Vikt.Spitsyn, G.M.Nesmeianova, E.A.Kanevskii "Certain problems of the thermodynamics and kinetics of solution of uranium oxides in an acid medium," discussed by O.A.Songina, Z.B.Rozhdestvenskaia. Zhur.neorg. khim. 8 no.3:781-782 Mr '63. (MIRA 16:4)
(Uranium oxides) (Solution (Chemistry)) (Spitsyn, Vikt.)
(Nesmeianova, G.M.) (Kanevskii, E.A.)



[illegible], B.Ya., [illegible]

Composition of thiourea complexes of silver formed during amperometric titration. Zhur. anal. khim. 18 no.3,323-328 Mr'63. (MIRA 17:4)

1. Kuybyshevskiy industrial'nyy institut i Kuzakhskiy gosudarstvennyy universitet.

OSPANOV, Kh.K.; ROZHDESTVENSKAYA, Z.B.; SONGINA, O.A.

Polarographic study of unithiol on a dropping mercury electrode. Zhur.anal.khim. 18 no.4:430-434 Ap '63. (MIRA 16:6)

1. S.M.Kirov Kazakh State University, Alma-Ata.
(Propanesulfonic acid) (Polarography)
(Electrodes, Dropping mercury)

SONGINA, O.A.; STUDENSKAYA, L.S.

Interaction of the electrode material with a solution in the presence of oxidizing agents. Zhur.anal.khim. 18 no.10:1269-1271 O '63. (MIRA 16:12)

1. Kazakh State University, Alma-Ata and Ural Scientific-Research Institute of Ferrous Metals, Sverdlovsk.

S/032/63/029/001/006/022
B101/B186

AUTHORS: Rozhdestvenskaya, Z. B., Songina, O. A., and Barikov, V. G.

TITLE: Amperometric determination of uranium by a graphite electrode

PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 1, 1963, 30 - 33

TEXT: The amperometric titration with Trilon B is described for solutions containing 10^{-3} - 10^{-8} g uranium. Using a platinum electrode the current was very unstable, probably in consequence of oxidation and complex formation, so a graphite rod as usually employed in spectrum analyses was adopted as electrode. This gave stable amperages at low concentrations. The potential of graphite was +0.2 v as measured against a mercury iodide reference electrode. U(VI) was reduced with formamidine sulfonic acid to U(IV). The solution heated by the reduction process had to be cooled to room temperature since temperature variations affected the result. $Hg(NO_3)_2$ served as indicator. The pH of the solution to be titrated should be 1.5 - 2. At very low concentrations the end point of titration becomes indistinct through blurring of the titration curve, but it can be

Card 1/2

MISHCHENKO, A.I.; SONGINA, O.A.

Determination of silver by the anodic iodide amperometric method. Zav.lab. 29 no.2:162 '63. (MIRA 16:5)

1. Kazakhskiy gosudarstvennyy universitet.
(Silver--Analysis) (Conductometric analysis)

SONGINA, O.A.; SAVITSKAYA, I.S.

Determination of V^{4+} and V^{5+} by the method of amperometric titration with two indicator electrodes. Zav.lab. 29 no.4:401-402 '63. (MIRA 16:5)

1. Kazakhskiy gosudarstvennyy universitet im. S.M.Kirova.
(Vanadium--Analysis) (Conductometric analysis)

SHARIPOV, R.K.; SONGINA, O.A.

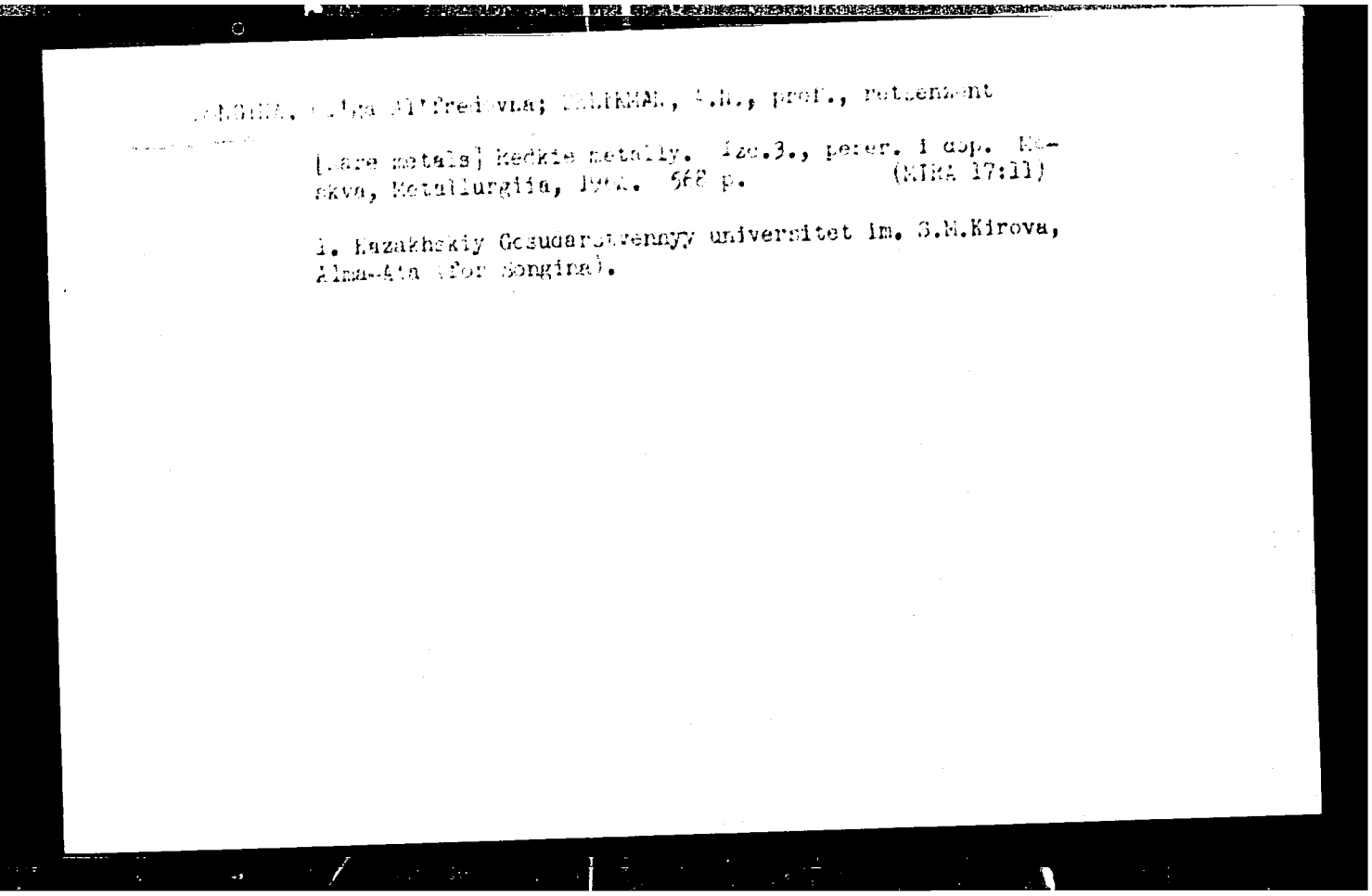
Electrochemical determination of molybdenum based on the catalytic oxidation of iodide by hydrogen peroxide. Zav.lab. 29 no.11: 1293-1296 '63. (MIRA 16:12)

1. Kazakhskiy gosudarstvennyy universitet im. S.M.Kirova.

ZAKHAROV, V.A.; SONGINA, O.A.

Effect of iodide on the polarographic behavior of oxygen on a platinum electrode. Zhur.fiz.khim. 37 no.7:1450-1454 Jl '63. (MIRA 17:2)

1. Kazakhskiy gosudarstvennyy universitet.



[illegible], Alma Alfredovna; [illegible], S.N., prof., retsenzent

[Rare metals] Redkie metally. Izd.3., perer. i dop. Moskva, Metallurgiia, 1964. 968 p. (MIRA 17:11)

1. Kazakhskiy Gosudarstvennyy universitet im. S.M.Kirova, Alma-Ata (for Songina).

L 5073-65 EWT(m)/EWP(t)/EWP(b) IJP(c), JD/JG

ACCESSION NR: AP5001770 S/0063/64/009/006/0697/0698

AUTHOR: Songina, O. A.; Kemeleva, N. G.; Ustimov, A. M.

TITLE: Amperometric determination of cerium and total rare earth elements

SOURCE: Vsesoyuznoye khimicheskoye obshchestvo. Zhurnal, v. 9, no. 6, 1964, 697-698

TOPIC TAGS: direct oxidative cerium titration, cerium 4, amperometric cerium determination, amperometric rare earths determination

ABSTRACT: Direct oxidative titration of cerium (IV) by oxalate was used, which is suitable for the further amperometric determination of the sum of rare earth elements (REE) as oxalates by means of permanganate. This direct determination may be carried out in the presence of other REE as well as other elements, since none of these can be oxidized under these conditions, and no byproducts will be found in the solution at the end of the reaction. The specimens were dissolved in sulfuric acid, cerium was oxidized by ammonium persulfate in the presence of silver nitrate. The excess ammonium persulfate was removed by boiling

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L 25073-65

ACCESSION NR: AP5001770

and the cooled solution used for amperometric determination, in a nitric acid base electrolyte, first of Ce, then of the sum of REE. Comparison of results with those obtained by weighing the oxalate precipitate showed satisfactory agreement. "The student S. Sinitskaya and the laboratory technician P. I. Maslova took part in the amperometric titration." Orig. art. has: 1 table

ASSOCIATION: Kazakhskiy gosudarstveny*y universitet (Kazakhstan State University)

SUBMITTED: 10Dec63 ENCL: 00 SUB CODE: IC, GC

NR REF SOV: 003 OTHER: 002

Card 2/2

SONGINA, O.A.; OSPANOV, Kh.K.; ROZHDESTVENSKAYA, Z.B.

Polarographic study of the electrolytic oxidation of unithiol on a platinum electrode. Zhur. anal. khim. 19 no.2:168-173 '64. (MIRA 17:9)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova, Alma-Ata.

BARIKOV, V.G.; SOKGINA, O.A.

Graphite electrode in electrochemical methods of analysis (survey).
Zav. lab. 30 no.1:5-8 '64. (MIRA 17:9)

VOYLOSHNIKOVA, A.P.; SOKOLINA, V.A.

Amperometric determination of antimony in [illegible].
Zav. lab. 30 no.1:1[illegible].

1. Kazakhskiy tekhnologicheskiy institut i Kazakhskiy gosudarstvennyy universitet.

SOKOLINA, O.A.; USPANOV, Kh.K.; ROZHDESTVENSKAYA, Z.B.

Amperometric titration of gold by an unithiol solution. Zav. lab. 30 no.6:664-667 '64 (MIRA 17:8)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova.

ZAKHAROV, V.A.; SONGINA, O.A.

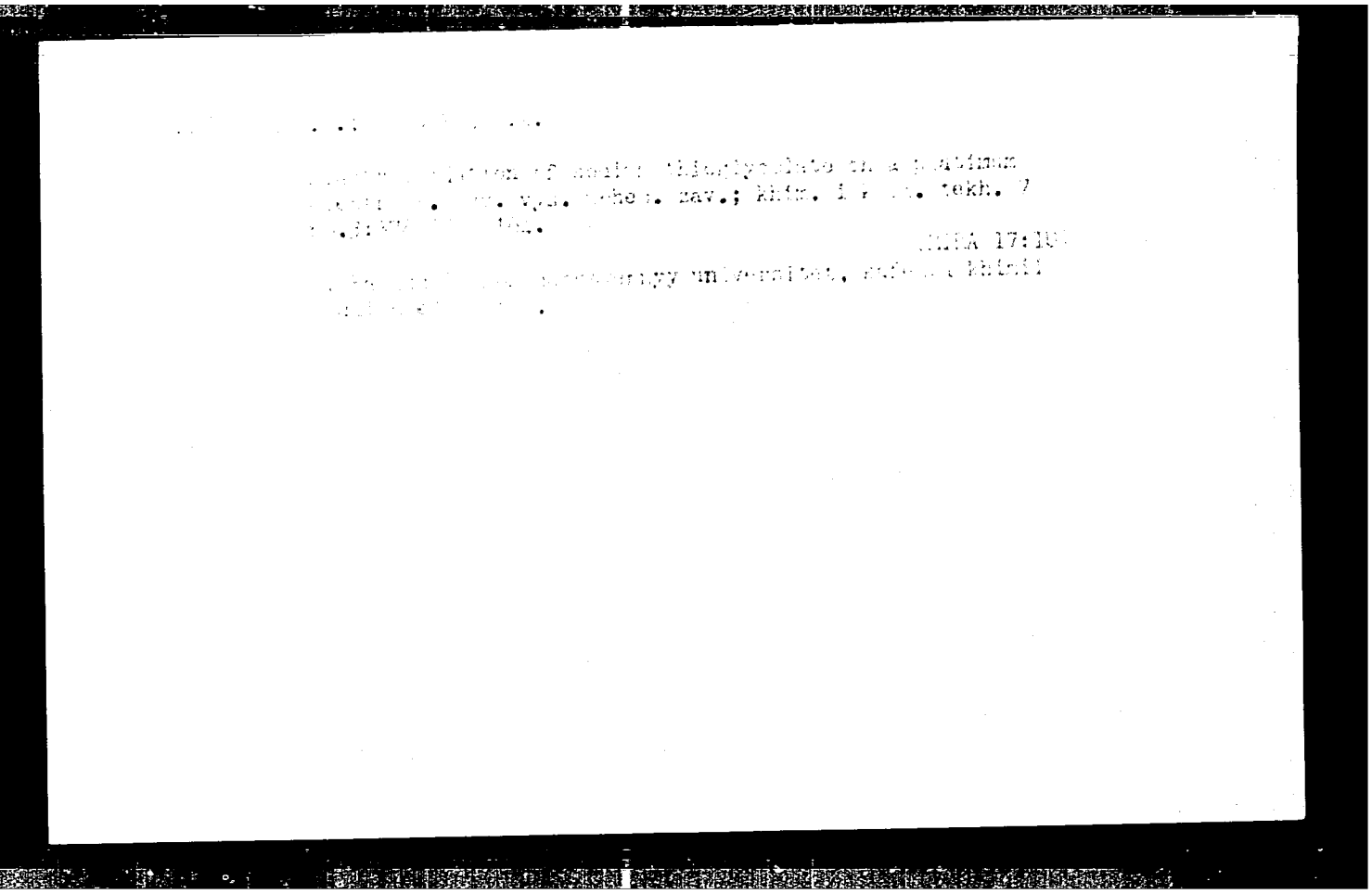
Anodic oxidation of arsenite ion on a rotating platinum electrode. Zhur. fiz. khim. 38 no.3:767-770 Mr '64. (MIRA 17:7)

1. Kazakhskiy gosudarstvennyy universitet.

[illegible], A.I.; SOKOLINA, O.A.

Polarographic behavior and amperometric titration of gold on a rotating platinum wire electrode. Zhur. anal. khim. 19 no.3:303-307 '64. (MIRA 17:9)

1. Kazakhskiy gosudarstvennyy universitet, Alma-Ata.



PASHCHENKO, A.I.; SONGINA, O.A.

Amperometric determination of silver and gold in blister copper.
Zav. lab. 30 no.9:1064-1066 '64. (MIRA 18:3)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova.

BARIEV, V.G.; BONGINA, O.A.

Determination of the microquantities of mercury by the method of deposition on and removal from a graphite electrode. Zav. lab. 30 no.10:1184-1187 '64. (MIRA 18:4)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova.

L 50212-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/GS

ACCESSION NR: AT5008404 S/0000/64/000/000/0055/0059

18
B+1

AUTHOR: Songina, O. A.; Mishchenko, L. V.

TITLE: Polarographic determination of indium in the presence of tin in sulfosalicilate and fluoride-sulfosalicilate supporting electrolytes

SOURCE: AN SSSR. Sibirskoye otdeleniye. Khimiko-metallurgicheskiy institut. Khimicheskiy analiz tsvetnykh i redkikh metallov (Chemical analysis of nonferrous and rare metals). Novosibirsk, Redizdat Sib. otd. AN SSSR, 1964, 55-59

TOPIC TAGS: indium, chemical analysis, polarographic analysis

ABSTRACT: A polarographic method was developed for determining indium in the presence of very large amounts of tin in a sulfosalicilic acid supporting electrolyte. A Heyrovsky polarograph was used. The maximum sensitivity of the galvanometer was $2 \cdot 10^{-9}$ a/mm. The capillary characteristics were $m^{2/3}t^{1/16} = 3.19$. Saturated calomel electrodes were used as the anode. Indium polarograms were taken in sulfosalicilic acid with concentrations from $5 \cdot 10^{-2}$ to 1 M in a pH range of 2-6. It was found that under these conditions indium gives well defined waves which could be analytically useful. Above pH 6 indium gives no wave. Within a pH range of 3-5 sulfosalicilic acid shifts $E_{1/2}$ of indium toward negative values, but has essential-

Card 1/2

L 50212-65
ACCESSION NR: AT5008404

ly no effect on the wave height. It was determined that in a 1 M sulfosalicilic acid solution at pH = 3.5-4.2 it is possible to determine as little as 2 µg/ml of indium in the presence of large quantities of tin. Here the pH of the solution must be rigorously controlled. The use of a mixed fluoride-sulfosalicilate supporting electrolyte consisting of 1 M sulfosalicilic acid and 0.2 M NH_4F solution enables the determination of indium in the presence of tin in 3.5-5.5 pH range. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 01Sep64 ENCL: 00 SUB CODE: GC

NO REF SOV: 008 OTHER: 004

Card 2/2

SHARIFOV, K.K.; SOKOLINA, O.A.

Polarographic study of the catalytic waves of hydrogen peroxide reduction in the presence of zirconium. Zhur. anal. khim. 19 no.11: 1322-1325 '64. (MIRA 18:2)

1. Kazakh State University, Alma-Ata.

SOKOLOVA, O.A.; USTYANTSOV, A.A.

Modified type of a reference electrode for amperometric titration.
Zav. lab. 30 no.11:1419-1420 '64 (MIRA 18:1)

1. Kazakhskiy gosudarstvennyy universitet.

[redacted], V.I.; [redacted] O.

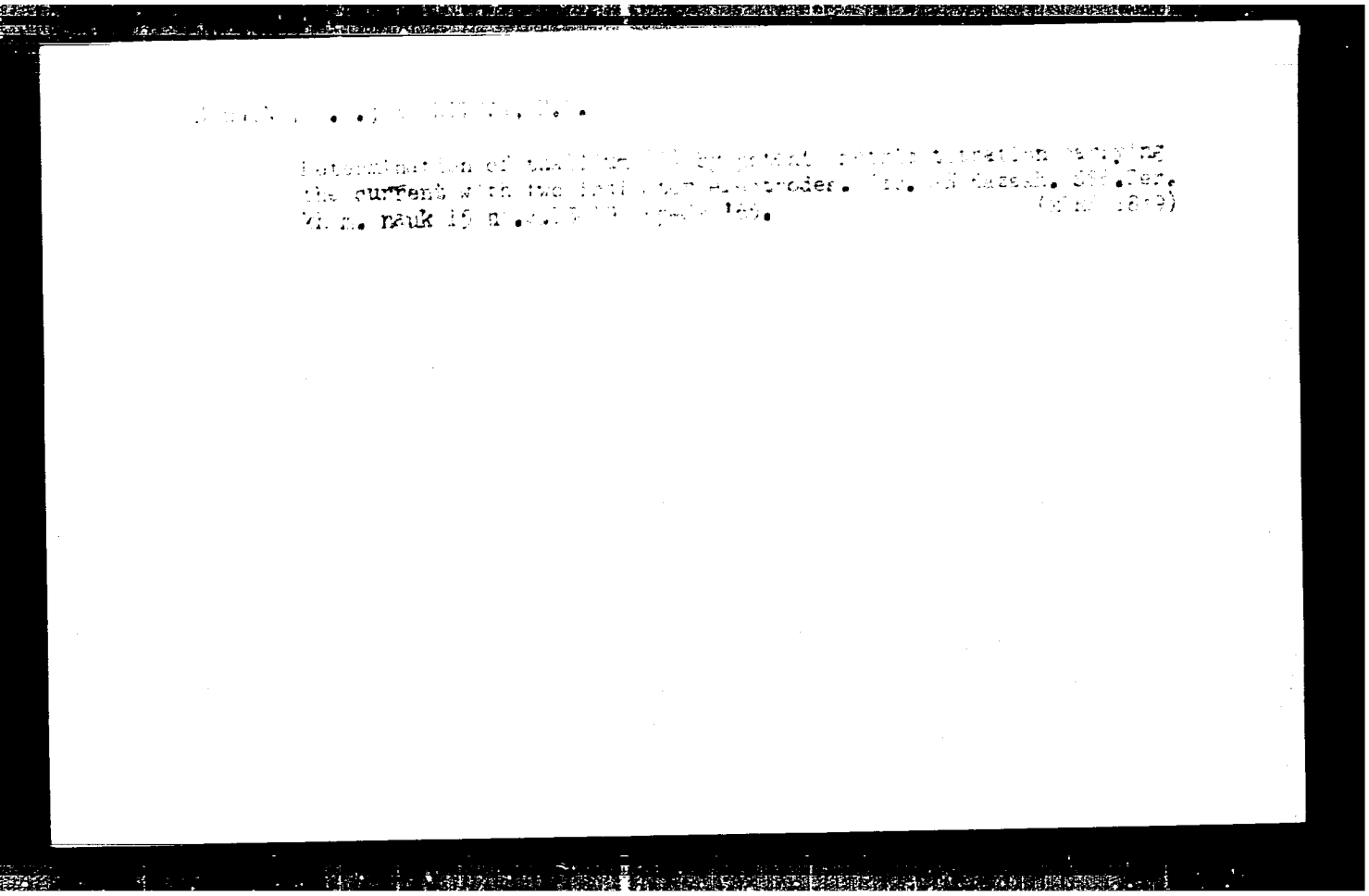
Interaction between electrode mercury and oxidizing agents. Zhur. fiz. khim. 38 no.7:1728-1733 Jl '64. (MIRA 18:3)

1. Kazakhskiy gosudarstvennyy universitet, Alma-Ata.

ZAKHAROV, [illegible]; [illegible], O.A.

Effect of iodide on the polarographic behavior of di- and trivalent iron on a platinum electrode. Zhur. fiz. khim. 38 no.10:2474-2478 O '64. (MIRA 18:2)

1. Kazakhskiy gosudarstvennyy universitet, Alma-Ata.



YUSUPOVA, A.B.; SOKGINA, O.A.

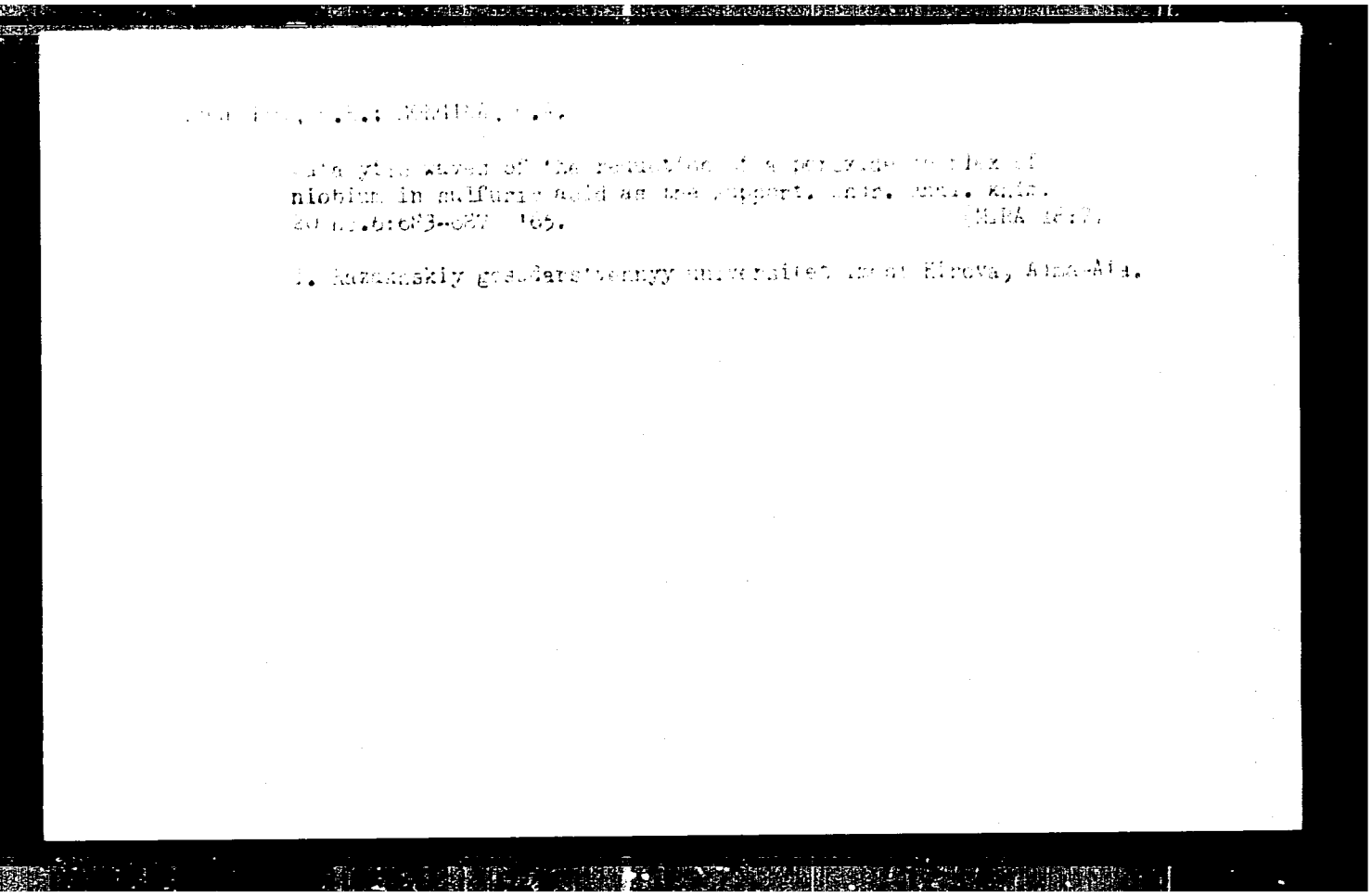
Solubility of some copper minerals and rhenium disulfide in various solvents. Izv. Al Kazakh.SSR.Ser.khim.nauk 15 no.3:15-20 Jl-Ag '65. (MIRA 18:11)

1. Submitted December 24, 1964.

SONGINA, O.A.; OSPANOV, Kh.K.; ROZHDESTVENSKAYA, Z.B.

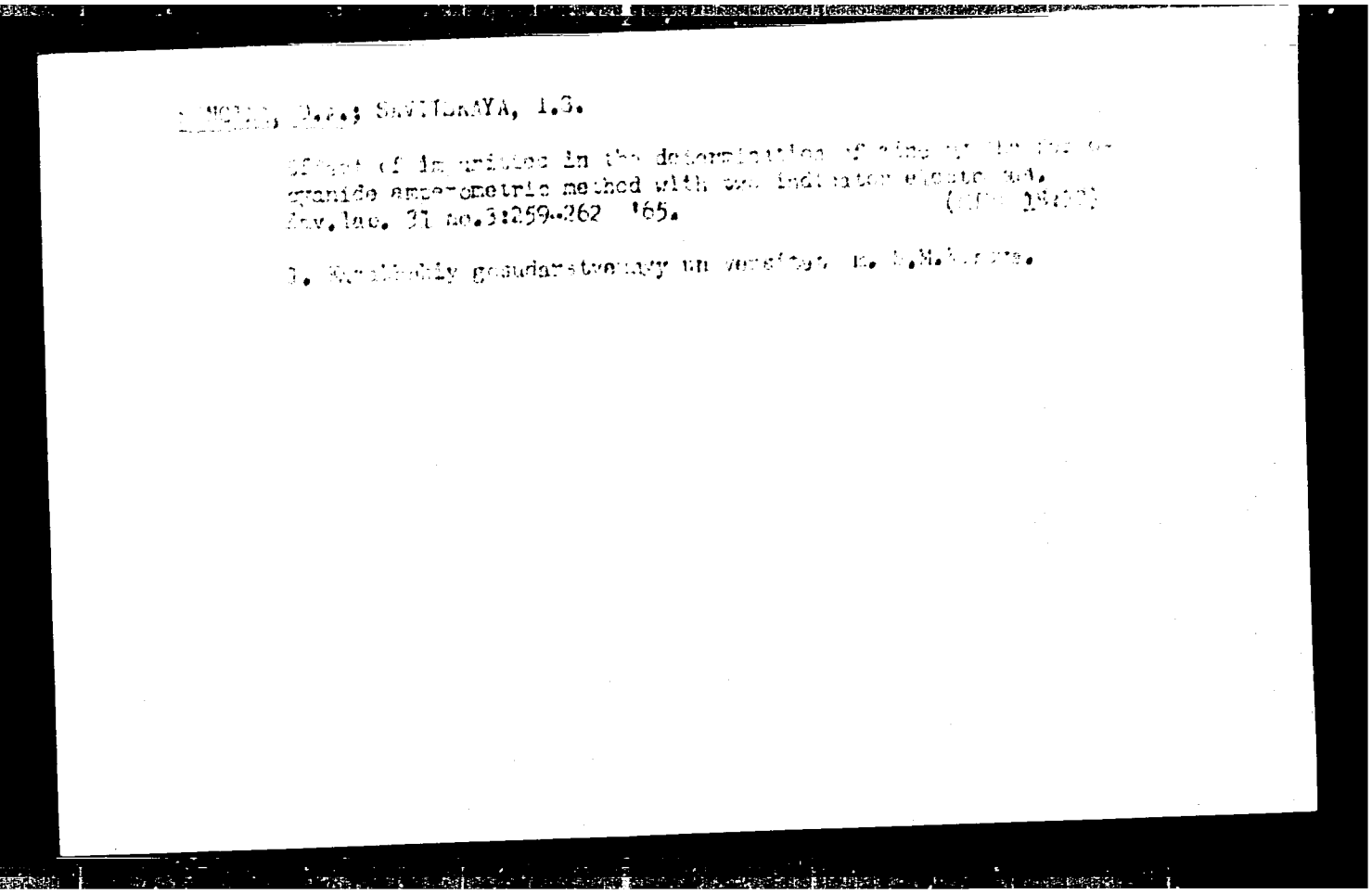
Amperometric titration of univalent and divalent mercury with a solution of unithiol. Zhur. anal. khim. 20 no.1 55-58 '65. (MIRA 18:3)

1. Kazakhskiy gosudarstvennyy universitet imeni Kirova, Alma-Ata.



[illegible], G.I., [illegible]IY, Ye.M.; KLUBNICHKIN, K.I.; SHAPIRO, I.S.

Rare metals and technological progress. Review of the book by I.I. Stepanov. Tsvet. met. 38 no.6:95 Je '65.
(MIRA 18:10)



[illegible], D.A.; SAVITSKAYA, I.S.

Effect of impurities in the determination of cobalt by the potassium cyanide amperometric method with an indicator electrode. Zav.lab. 31 no.3:259-262 '65. (MIRA 18:3)

1. Gosudarstvennyy nauchno-issledovatel'skiy [illegible].

SONGINA, O.A.

Amperometric titration; a survey. Zav.lab. 31 no.10:1163-1172 '65. (MIRA 19:1)

PASHCHENKO, A.I.; SONGINA, O.A.; KARGINA, N.I.

Amperometric titration of gold with thiourea. Zav. lab. 31 no.11: 1312-1314 '65. (MIRA 19:1)

1. Kazanskiy gosudarstvennyy universitet.

SONGINA, O.A.; DAUSHEVA, M.R.

Electrochemical reduction of sparingly soluble mercury compounds. Elektrokhimiia 1 no.12:1464-1468 D '65. (MIRA 19:1)

1. Kazakhskiy gosudarstvennyy universitet imeni S.M.Kirova. Submitted March 13, 1964.

SONHOFFER, Szilare; GERO, Sandor

Disturbances of lipid metabolism. Magy. Tudom. Akad. Biol. Orv. Oszt. Kozl. 8 no.1-2:49-58 1957.

1. A Pecsi Orvostudomany Egyetem Korelettani Intezete es a Budapesti Orvostudomanyi Egyetem III. Belklinikaja.
(LIPIDS, metab. disord. (Hun))

KOZLOV, N.S.; SONICH, I.P.

α-Furyl-β-aminoaryl ketones. Zhur. ob. khim. 34 no. 3:927-929 Mr '64. (MIRA 17:6)

1. Permskiy pedagogicheskiy institut.

SONICHEV, S.

Grades and actual knowledge. Prof.-tekhn.obr. 13 no.3:10-13 Mr '56. (MLRA 9:7)

1.Zaveduyushchiy metodicheskim kabinetom Sverdlovskogo oblastnogo upravleniya trudovykh rezervov.
(Technical education) (Grading and marking (Students))

SONICHEV, S.

Still a word on the quality of lessons. Prof.-tekhn. obr. 13 no.8:11-13 Ag '56. (MLRA 9:10)

1. Zaveduyushchiy metodicheskim kabinetom Sverdlovskogo oblastnogo upravleniya trudovykh reservov.
(Technical education)

SONIEWSKI, W.

"Series capacitors."

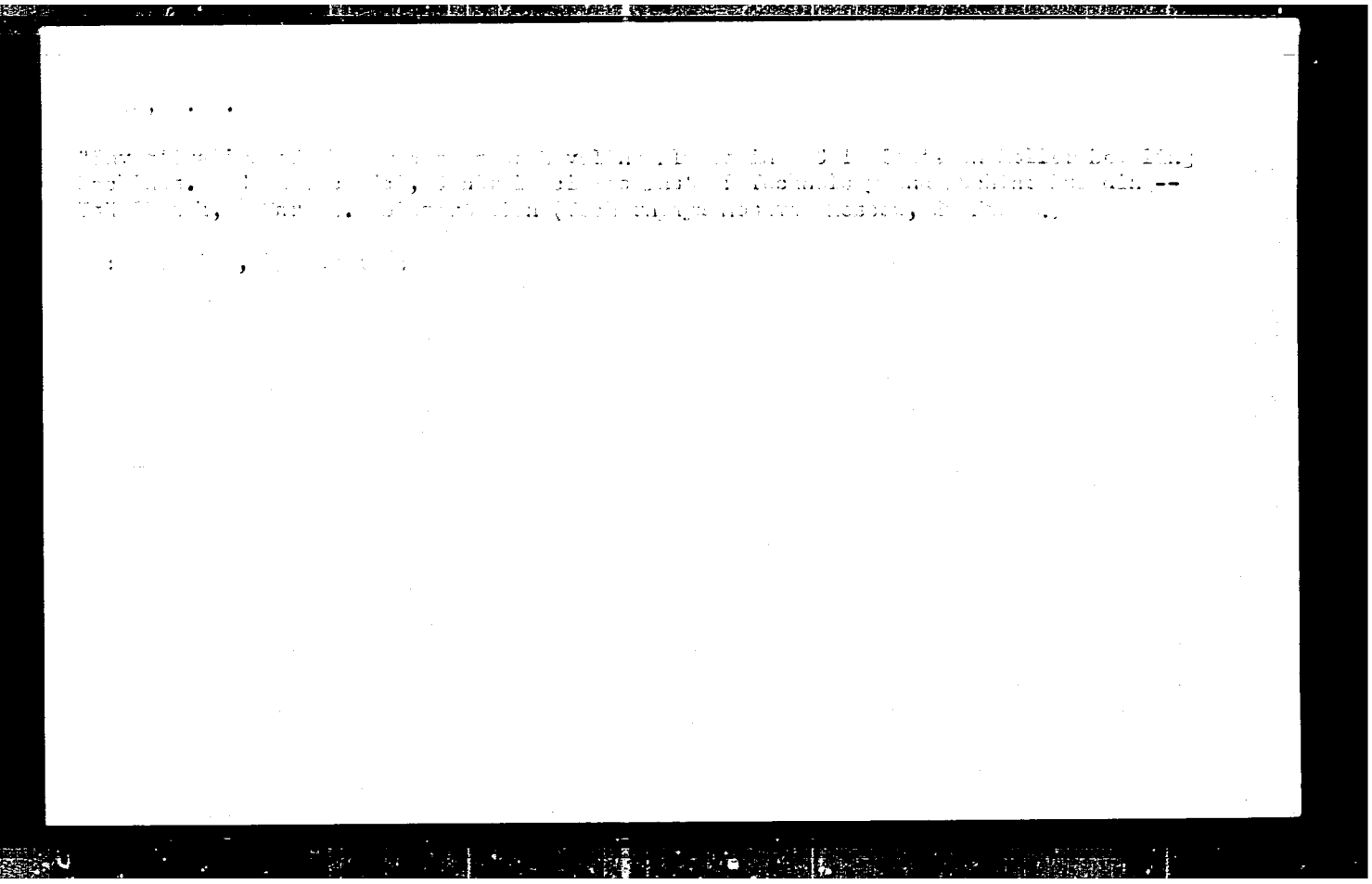
Pt. 1. p. 307 (Wiadomosci Elektrotechniczne) Vol. 17, no. 12, Dec. 1957
Warsaw, Poland

SO: Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 4, April 1958

MYNKIN, P.V.; SONIN, A.A.

Automatic push-rod stamping press. Avt.trakt.prom. no.4:insert Ap '55. (MLRA 8:5)

1. Moskovskiy avtozavod im. Stalina.
(Power presses)



SONIN, A.L., kandidat tekhnicheskikh nauk.

Study of rolling machines used in the straightening of thin sheet metal. [Trudy] TSNIITMASH no.78:30-73 '56. (MLRA 10:1)
(Rolls (iron mills)) (Sheet metal)

SONIN, A. S.

Refraction of hydrogen bonds in inorganic compds. II. S. S. Batsanov and A. S. Sonin (M. V. Lomonosov State Univ., Moscow). Kristallografiya 1, 321-7(1956); cf. C.A. 49, 8352b.—The change in the amt. of the refraction due to H bonds of the type xH...O is parallel to the change in the effective neg. charges of the O atoms. The ns of the inorg. compds. are extrapolated first from measurements in the visible range to $\lambda = \infty$ by the method given by P. Wulff, C.A. 27, 4146. From these ns are calcd. the R_∞, and the differences ΔR_∞, e.g. $R_{NH_4} - R_K = 1.60$ cc. (av. derived from the halides). Corresponding NH_4 and K salts of oxyacids give corresponding $\bar{n} = \sqrt{n_1 n_2 n_\infty}$ for the av. ns, and $\bar{n}_\infty$ for $\lambda = \infty$, R_∞, and ΔR_∞ data. The latter are usually somewhat higher than the 1.60 cc. difference, and this excess (ER) in R_∞ is a measure of the fraction of the H bonds in the compds. The higher the field strengths (electronegativity) of the central atom, the higher is this ER value. For the H bond in the NH_4 group with the symbol $_N$H...O it varies between 0.17 and 0.50, and depends on the polarizing power of the central ion X in the oxysalt radical XO_4. For ClO_4^- it is 0.17, for AsO_4^{---} it is 0.50. The higher the electronegativity of the central atom, the more covalent is the binding mechanism in the complex, and the lower the ER value. The ratio of the H-bond refraction in NH_4NO_3 and in $(NH_3)_5Co(NO_2)_6$ is about 1:6. In NH_4NO_3 every O is connected with 2 H; in Co ammine complex compds. each O is connected only with 1 H. A comparison of the refractions for $_N$H...O and $_O$H...O in ice and in crystallized hydrates is interesting. The av. R_{H_2O} for the latter = 3.42 cc., whereas in ice it =

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S. S. Batsanov and A. A. Lonin

3.69 cc. The difference, 0.26, corresponds to 2 H bonds, i.e. for one H bond $R(_OH\ldots O) = 0.13$ cc. In gypsum, $KH_2PO_4.3H_2O$, and $SrCl_2.6H_2O$ $R_{H_2O} = 3.57, 3.67, 3.03$, resp., i.e. $R(_OH\ldots O)$ in ice is lower. It is concluded that in these salts H bonds also exist of about the same kind as in ice, with equal or smaller refractions (0.13 to 0.07 cc.). III. S. S. Batsanov. *Ibid.* 328–33.—The calcns. of the refractions for H bonds $_OH\ldots N$ and $_NH\ldots N$ in ferro- and ferricyanides, azides, and thiocyanates are extended by extrapolations and differences (*ER*) by the method used in part II. In $K_4Fe(CN)_6.3H_2O$ the R_{H_2O} is higher by 0.47 cc. than that of water of crystn. (3.42). This difference corresponds to 2 H bonds $_OH\ldots N$ with a refraction of 0.24 cc. For the NH_4 salts of $H_4Fe(CN)_6$, $H_3Fe(CN)_6$, HN_3, and HCNS the following $R(_NH\ldots N)$ are calcd. from the *ER* data: 0.24, 0.10, 0.14, 0.20 cc., resp. It is evident that the central Fe^{++} in $[Fe(CN)_6]^{4-}$ brings about a higher $R(_NH\ldots N)$ (0.24) than does the central Fe^{+++} in the ferricyanide complex anion (0.10). The high refraction in NH_4CNS demonstrates the excessive neg. charges on N in the CNS group: $(\dot{S}=C=\bar{N})$. Analogous considerations are valid for N_3^- $(\bar{N}=\dot{N}=\bar{N})$. In every case, the rule is established that the refractions of H bonds of the type H...N and O...H are detd. by the amt. of the effective neg. charges of that atom that builds up the H bond. Therefore they vary parallel with the change in polarization strengths. W. Eitel

2/2 LFH

24(3), 24(2)

AUTHORS: Zheludev, I. S., Sonin, A. S. SOV/48-22-12-7/33

TITLE: On the Question of the Search for New Piezoelectrics (K voprosu o poiske novykh segnetoelektrikov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958, Vol 22, Nr 12, pp 1441 - 1444 (USSR)

ABSTRACT: The search for new materials possessing piezoelectric properties is of topical interest for both science and technique. New piezoelectrics can only be found on the basis of essential characteristics marking the formation conditions of spontaneous polarization in the crystal. These characteristics are ascertained basing on the analysis of characteristic properties of known piezoelectrics. The existence of a domain structure can be considered as an essential characteristic feature. The phase transitions of the first or second type are also an important characteristic of piezoelectric properties. Piezoelectrics of the oxygen-octahedron type and those containing hydrogen compounds present other characteristic features.

Card 1/3 Smolenskiy-Mattias' crystallo-chemical characteristic

(Refs 9,10) is regarded as belonging to the first type. Piezoelectrics containing hydrogen, make the problem more complicated. Here it is much more difficult to formulate the characteristics, because the mechanism leading to the formation of spontaneous polarization is very unclear (Ref 11). The chemical composition and its structure are moreover extremely complicated and varied. It was already earlier mentioned (Ref 13) that the symmetry variation of all piezoelectrics hitherto known which takes place during the phase transitions, is subject to certain rules. Symmetry variations of a few piezoelectrics during their phase transitions are given in table 1. This table is a supplement of the published data. (Ref 13). The conclusion has been drawn that a variation of point symmetry, belonging to one of the pyroelectric classes, can be held as a characteristic of piezoelectric phase transitions for all dielectrics. This characteristic is called the crystallographic feature of spontaneous polarization. Such materials were chosen in this work for which the variation of symmetry at phase transitions was known to be subject to the crystallographic characteristic (Table 2). In conclusion it is pointed out, however, that the mentioned characteristics

are indeed necessary, but not sufficient. The search for new piezoelectrics is facilitated by them, but neither shortened nor theoretically completely substantiated. The next paper, therefore, will be dedicated to the investigating of piezoelectric properties of the materials recorded in table 2, as well as to the determination of optimum conditions of existence for spontaneous polarization in crystals. The authors thank L. Z. Rusakov, I. S. Rez, V. V. Gladkov for their assistance. There are 2 tables and 13 references, 4 of which are Soviet.

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography, Academy of Sciences USSR) TsNILP Komiteta po radioelektronike Soveta Ministrov SSSR (TsNILP of the Committee of Radioelectronics, Cabinet Council USSR)

SOV/70-4-1-11/26

AUTHORS: Rez, I.S., Sonin, A.S., Tsepelevich, Ye.Ye. and Filimonov, A.A.

TITLE: Experimental Investigations in Finding New Piezoelectric Materials (Eksperimental'nyye issledovaniya po vyyavleniyu novykh p'yezoelektrikov)

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 1, pp 65-68 (USSR)

ABSTRACT: Lists are given of materials tested for piezoelectricity (with a piezoelectric tester, PT-2). The authors found: 39 inorganic and complex compounds showing marked piezoeffects; 43 inorganic and complex compounds with inappreciable piezoeffects; 90 organic compounds showing marked piezoeffects; 184 organic compounds showing inappreciable piezoeffects. There are 4 references, 3 of which are Soviet and 1 English.

ASSOCIATION: TsNILP

SUBMITTED: December 7, 1958

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SOV/70-4-3-26/32

AUTHORS: Zheludev, I.S. and Souin, A.S.

TITLE: Rotation of Plane of Polarisation of Light and the Symmetry of Crystals

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 3, pp 425-429 (USSR)

ABSTRACT: The changes in the symmetry of crystals conditioned, in the general case, by the changes (appearance, change of sign, change of magnitude) in the specific rotation ρ of the plane of polarisation of light are investigated. The specific rotation in one direction is described by an axial tensor of symmetry $\infty : 2$. The gyration surface of a crystal can belong to one of the four symmetry groups 2:2, 4.m, ∞:2 and ∞/∞. The morphological symmetry groups of crystals which show rotation either coincide with these groups or their sub-groups. Point groups which can show rotation are 1,2,3,4,6, 2:2, 3:2, 4:2, 6:2, m, 2.m. 4.m, 3/4, 3/2, 4.
A change in the point symmetry of a crystal on phase transition conditioned by a change in the rotation can be found from Curie's principle (A.V. Shubnikov - Ref 4).

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Rotation of Plane of Polarisation of Light and the Symmetry of Crystals

According to this principle the symmetry of the crystal on change of rotation can be determined as the highest common sub-group of the point group to which the crystal belongs in its initial state and the symmetry group of the gyration surface for the given disposition of the symmetry elements of both groups. Hence, for any of the 32 classes the change in symmetry connected with a change in rotation can be found. This is tabulated for all classes and for the 4 symmetries of gyration surface. There are 5 tables and 4 Soviet references.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc., USSR)

SUBMITTED: March 17, 1959

SOV/70-4-4-5/34

AUTHORS: Sonin, A.S. and Zheludev, I.S.

TITLE: Spatial Symmetry and Ferroelectric Phase Transitions

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 4, pp 487-497 (USSR)

ABSTRACT: Tables are given showing, for each of the 230 space groups, the space groups which result when a crystal of the initial space group undergoes a ferroelectric transition developing a spontaneous polarisation $\bar{P}_o$ along one of the axes $\langle 100 \rangle$, $\langle 111 \rangle$, $\langle 110 \rangle$, $\langle hk0 \rangle$, $\langle hkk \rangle$, $\langle hhk \rangle$ or $\langle hkl \rangle$ (for the cubic case) or other appropriate axes for the other crystal systems. Examples of 17 experimental transitions in various crystals are collected and all agree with the theoretical scheme. The tables can be used to predict the symmetry on transition, to limit the search for ferroelectric transitions or to find the directions of polarisation.
The groups are obtained by taking the highest common sub-group of the symmetry group of the crystal class in the para-electric state and the symmetry group of the

Card1/2

Spatial Symmetry and Ferroelectric Phase Transitions

polar vector $\bar{P}_c$, of symmetry $\infty.m$, in the given orientation of crystal and polarisation symmetry elements. A ferroelectric in its polarised state can belong to one of only 68 space groups of the 10 pyroelectric classes (with polar directions). There are 7 tables and 19 references, of which 7 are Soviet, 8 English, 1 international, 2 German and 1 Japanese.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography of the Ac.Sc. USSR)

SUBMITTED: May 4, 1959

PHASE I BOOK EXPLOITATION SOV/4379

Vsesoyuznaya konferentsiya po fizike dielektrikov. 2d, 1958

Fizika dielektrikov, trudy vtoroy vsesoyuznoy konferentsii (Physics of Dielectrics, Transactions of the 2d All-Union Conference on the Physics of Dielectrics) Moscow, Izd-vo AN SSSR, 1960. 532 p. Errata slip inserted. 5,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Fizicheskiy institut imeni P.N. Lebedeva.

Ed. of Publishing House: Ye.L. Starokadomskaya. Tech. Ed.: I.N. Dorokhina. Editorial Board: (Resp. Ed.) G.I. Skanavi, Doctor of Physics and Mathematics (Deceased), and K.V. Filippova, Candidate of Physics and Mathematics.

PURPOSE: This collection of reports is intended for scientists investigating the physics of dielectrics.

COVERAGE: The Second All-Union Conference on the Physics of Dielectrics held in Moscow at the Fizicheskiy institut imeni P.N. Lebedeva (Physics Institute imeni P.N. Lebedev) in November 1958 was attended by representatives of the principal scientific centers of the USSR and of several other countries. This collection contains most of the reports presented at the conference and summaries of the discussions which followed. The reports in this collection deal with dielectric properties, losses, and polarization, and with specific inductive capacitance of various crystals, chemical compounds, and ceramics. Photoelectrets, ferroelectric crystals, and various radiation and irradiation effects on dielectrics are investigated. The volume contains a list of other papers presented at the conference dealing with polarization, losses, and breakdowns of dielectrics, which were published in the journal Izvestiya AN SSSR, seriya fizicheskaya, Nos. 1 and 2, 1960. No personalities are mentioned. References accompany each report.

Card 11/15

24.7700

AUTHORS: [illegible]

TITLE: [illegible] Plates on Their Thickness

PERIODICAL: [illegible], 1958, Vol 3, Nr 1, pp 145-147 (USSR)

ABSTRACT: The coercive field strength, the value of spontaneous polarization, and the duration of repolarization of single-domain crystals, obtained by different investigators, differ most likely because of the dependence of the values on the conditions of crystal growth, orientation of the tested plates, and the thickness of the latter. Thus the latter factor, first noticed by W. J. Merz on $BaTiO_3$, was examined by the authors. The plates were cut off normal to polar axis, abraded to the desired thickness, washed in benzene, covered with Ag sublimate completely or within a cross-shaped area of contacts, and tested for the value of spontaneous polarization,

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Concerning the Dependence of the Dielectric Properties of Polycrystalline Plates on Their Thickness

78115
SOV/70-5-1-24/30

[illegible] repolarization at room temperature. The test results are illustrated in Figs. 1 and 2. The figures reveal that for the plates [illegible] completely, E_c increases and P_s decreases almost exponentially with the increasing thickness of specimens until a reaches 0.7 mm, and then remain constant. For the plates with cross-shaped electrodes, [illegible]. The time required for repolarization is increased almost linearly with the increasing thickness of plates. The defects resulting from grinding the plates a nonferroelectric surface layer which in turn affects the properties of plates substantially. The possible causes of the observed peculiarity are briefly reviewed. I. S. Zheludev and L. S. Reznikova are acknowledged for guidance and I. V. Kovalev for specimens. There are 3 figures; and 9 references, 3 U.S., 1 U.K., 1 Soviet. The U.S. and U.K. references are: W. P. Mason, J. Appl. Phys., 27, [illegible] (1956); H. H. Wieder, Proc. IRE, 45, 1094 (1957);

Card 2/3

76115
SOV/70-5-1-24/30

Concerning New Data on the Ferroelectric Properties of Rochelle Salt Crystals and Their Thickness

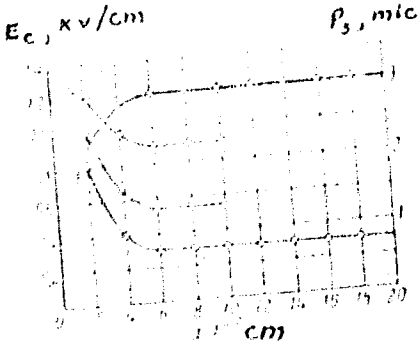

FIG. 1. Dependence of the spontaneous polarization and coercive field of triglycinesulfate on the thickness of specimens at room temperature and 50-cycle frequency. (1) E_c and (2) P_s for specimens completely covered with silver sublimate; (3) E_c and (4) P_s for specimens with cross-shaped electrodes.

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Concerning the Dependence of the Dielectric Properties of Triglycine Sulfate Plates on Their Thickness

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SOV/70-5-1-24/30

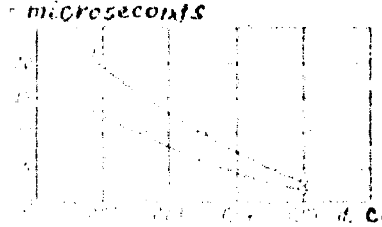

Fig. 2. Dependence of the duration of repolarization of triglycine sulfate on the thickness of specimens. (1) E = 1 kv/cm; (2) E = 1.2 kv/cm.

W. Känzig, Phys. Rev., [illegible], [illegible] ([illegible]); C. F. Pulvari, W. Kuebler, J. Appl. Phys., [illegible], 17[illegible] (1958); M. Prutton, Proc. Phys. Soc., 7[illegible], [illegible] ([illegible]).

SUBMITTED: October 17, [illegible]

Card [illegible]

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S/048/60/024/010/009/033
B013/B063

AUTHORS: Sonin, A. S., Zheludev, I. S., Dobrazhanskiy, G. F.

TITLE: The Piezoelectric Properties of $NaNO_2$

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 10, pp. 1209 - 1212

TEXT: The rule governing the variations of point symmetry during piezoelectric phase transitions, which was established by one of the authors and L. A. Shuvalov in Refs. 1 and 2, enabled the authors to develop a crystal-physical criterion for the determination of new piezoelectric substances. The question as to whether this criterion is really necessary and, if any, sufficiently exact, could not be answered so far and, therefore, requires further experiments on compounds with given changes of symmetry. Here, the authors describe the piezoelectric properties of $NaNO_2$. The sodium nitrate monocrystals bred by I. V. Gavrilova at the beginning of 1958 could, due to their high electrical conductivity, not be used for dielectric measurements. The crystals

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examined in the present work were grown from a chemically pure trade-marked material melting at 271°C, using a modified method described by Obreimov and Shubnikov in Ref.10. The measurements were made by means of Vobzer's water thermostat between room temperature and 100°C and by means of a thermostat filled with an organo-silicon solution No. 5 between 100° and 200°C. The dielectric constant was measured at 500 kilocycles. Figs. 1 and 2 show the temperature dependence of the dielectric constant on three crystallographic axes. It may be seen that the dielectric constants have distinct peaks at the phase-transition temperatures. A Scheme providing for the compensation of conductivity (Ref.11) was used to study the dielectric hysteresis loops at 50 cycles. The shape of the hysteresis loop at 165°C (Fig.3) is indicative of the high conductivity of the crystal. Spontaneous polarization and coercive force were calculated from the hysteresis loops. The temperature dependences of these quantities are illustrated in Figs. 4 and 5. The shape of the hysteresis loops and the temperature dependence of the coercive force indicate the considerable hardness of $NaNO_3$ between room temperature and 147°C, the spontaneous polarization and the coercive

The Piezoelectric Properties of $NaNO_2$

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B013/B063

force decreasing near the Curie point. The deviation of the authors' results from the values mentioned in Ref.9 is related to the varying conditions of crystal growth. The authors thank V. I. Pakhomov and G. M. Lobanova for the preparation of the samples; I. Fenina for assistance in the experiments; and L. A. Shuvalov and I. S. Rez for a discussion of the measurements. The present paper was read at the Third Conference on Piezoelectricity, which took place in Moscow from January 25 to 30, 1960. There are 5 figures and 11 references: 6 Soviet.

ASSOCIATION: Institut kristallografii Akademii nauk SSSR (Institute of Crystallography of the Academy of Sciences USSR)

S/030/61/000/003/005/013
B105/B215

AUTHORS: Sheftal', N.N., Doctor of Geological and Mineralogical Sciences, Sonin, A.S.

TITLE: Scientific Council for the problem of the "Formation of Crystals"

PERIODICAL: Vestnik Akademii nauk SSSR, no. 3, 1961, 106 - 107

TEXT: Two All-Union Conferences on the growth of crystals are mentioned and it is found that conferences alone do not guarantee progress in the investigation of this field. The Scientific Council therefore decided to supplement these conferences on the problem of the "formation of crystals" by symposia with a restricted number of participants and reports. In 1960, three symposia were held in the Institut kristallografii (Institute of Crystallography) which were attended by representatives of academic institutes, departmental scientific research institutes, and schools of higher education of various cities of the country. The first symposium on metallic single crystals was held from October 24 to 26, 1960. Some problems on the growth of single crystals of perfect structures, and specific

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Scientific Council for the ...

problems on the crystallization kinetics of metallic crystals were discussed. Characteristics of this symposium were the combination of scientific and technological reports and useful discussions at a high theoretical level. The second symposium on piezo- and ferroelectric crystals took place between November 14, and 18, 1960. Problems on the relation between structure and ferroelectric properties were discussed, and also studies on new piezo- and ferroelectric crystals which are of great importance for industrial purposes. The influence of defects on the electrophysical properties of crystals, and problems of growth and some properties of paramagnetic crystals were studied. The third symposium on the growth of semiconducting crystals was held on November 28, and 29, 1960. Reports were given on the most important technological and theoretical problems of growing single crystals, and on new principles of crystal growth. Some basic problems of the technique of growth and the production and examination of new semiconducting compounds were discussed. The participants of the symposia approved of the initiative of the Scientific Council and emphasized the necessity of such systematic meetings of scientists. In future, 10 to 12 symposia annually are planned to be organized by the department of the

S/070/61/006/001/008/011
E032/E314

24.7800

AUTHOR: Sonin, A.S.

TITLE: Antiferro-electric Properties of NH_4I and NH_4Br Crystals

PERIODICAL: Kristallografiya, 1961, Vol. 6, No. 1, pp. 137 - 139

TEXT: The known structures and physical properties of NH_4I and NH_4Br are analysed to show that they are typical antiferro-electrics in the sense defined by C. Kittel (Phys. Rev., 82, 729, 1951 - Ref. 1). It is pointed out that studies of the electrical properties of these compounds are being carried out by the present author. Acknowledgments are expressed to I.S. Zheludev and L.A. Shuvalov for valuable advice. There are 2 figures and 17 references: 4 Soviet and 13 non-Soviet.

SUBMITTED: May 30, 1960

Card 1/1

22790

S/070/61/006/003/001/009
E081/E441

24.7100 (1153, 1136, 1142)

AUTHORS: Shuvalov, L.A. and Sonin, A.S.

TITLE: On the question of the crystallography of antiferroelectrics

PERIODICAL: Kristallografiya, 1961, Vol.6, No.3, pp.323-330

TEXT: On the basis of a formal investigation of the configuration of the antipolarization vectors, the crystallographic classification, the geometry of the domain structure, the possible point groups and the symmetry characteristics of antiferroelectrics are considered. An antiferroelectric crystal is formed as a result of phase transition from a paraelectric phase by slight distortion of the initial pseudosymmetrical structure. This structure can be represented by an even number of sublattices such that the polarizations are equal but oppositely directed in pairs. In the simplest type of antiferroelectric (for example tungsten oxide, WO_3), there are two sublattices, and an antiferroelectric of this type may belong to any crystallographic class, except the cubic classes. An antiferroelectric has a centre of symmetry only if there is a centre in the paraelectric phase, and if the paraelectric

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S/070/61/006/003/001/009
E081/E441

On the question of ...

phase is piezoelectric, the antiferroelectric phase is also piezoelectric. Thus, neither the presence of a centre of symmetry nor the absence of piezoelectricity is a certain indication of antiferroelectricity. Twinning is observed in many antiferroelectrics, and the separate components of the twin form antiferroelectric domains. Consideration of spontaneous polarization and antipolarization shows that an antiferroelectric with two sublattices cannot be formed by transition from a paraelectric phase belonging to one of the classes: 1, $\bar{2}$, 2, m, 3, 3 : 2, 3·m, 3 : m. The possible symmetry classes corresponding to two-and three-dimensional antipolarization and to transition from the paraelectric to the antiferroelectric phase are also discussed. Finally the polarization scheme and symmetry properties of crystals which can simultaneously show ferroelectric and antiferroelectric behaviour are examined. Acknowledgments are expressed to I.S.Zheludev and V.A.Koptsik for advice and discussion. There are 3 figures and 22 references: 12 Soviet-bloc and 10 non-Soviet-bloc. The four most recent reference to English language publications read as follows: G.Shirane, R.Pepinsky, Phys.Rev., 91,

Card 2/3

22790

S/070/61/006/003/001/009
E081/E441

On the question of ...

218, 1953; L. Cross, B.J.Nickolson, Philos. Mag., 46, 453, 1955;
E.A.Wood, W.J.Merz, B.T.Matthias, Phys.Rev., 87, 544, 1954;
F.Jona, G.Shirane, F.Mazzi, R.Pepinsky, Phys. Rev., 105, 849, 1957.

ASSOCIATION: Institut kristallografii AN SSSR
(Institute of Crystallography AS USSR)

SUBMITTED: October 22, 1960

Card 3/3

SONIN, A.S.

First symposium on research on the production of ferroelectric and piezoelectric crystals. Kristallografiia 6 no.4:650-651 Jl-Ag '61. (MIRA 14:8)
(Piezoelectric substances) (Ferroelectric substances) (Crystals--Growth)

45677

S/070/63/008/001/009/024
E132/E460

24.2132 24.7800

AUTHORS: Sonin, A.S., Zheludev, I.S.

TITLE: The investigation of certain dielectric properties of single crystals of sodium nitrite

PERIODICAL: Kristallografiya, v.8, no.1, 1963, 57-62

TEXT: Ferroelectricity in $NaNO_2$ was predicted by the authors in 1957. Crystals grown from solution were used first but were unsatisfactory because of high electrical conductivity. The dependence on temperature of dielectric constants, spontaneous polarization, coercive force, electric conductivity and piezo-electric properties of single crystals of sodium nitrite were investigated. The crystals used were made from the melt in closed ampules from salt which had been earlier dried in vacuo at a high temperature. They were non-hygroscopic. They cleaved easily parallel to (101). Plates of other orientations were thus difficult to prepare. Electrodes were applied by evaporating silver. The dielectric constants were measured at 500 Kc/s and, at room temperature, were $\varepsilon_a = 6.8$, $\varepsilon_b = 6.4$ and $\varepsilon_c = 7.8$; at 170°C a λ-point was found in the curve for ε_c

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which rose to above 800. Above the Curie point of 161°C e_c obeys the Curie-Weiss law. e_a and e_b show discontinuities of slope at the Curie point but do not exceed 14. The hysteresis loop was plotted at various temperatures. At room temperature the coercive force is higher than could be applied. Above 120°C the hysteresis loop could be observed. The spontaneous polarisation was measured as 8 microcoulombs/cm^2 and at 150°C the coercive force was 2 kV/cm changing linearly with temperature. The piezoelectric moduli were measured, d_{33} being 4.4×10^{-8} cgsu at room temperature. It changed little until above 160°C when a rapid fall to zero occurred. The electrical conductivity followed the law, $\log s = k/T$, giving an energy of activation of 0.72 eV above the Curie point and 0.90 in the ferroelectric region. Nonlinear effects were found when the susceptibility was measured as a function of field at 1 Kc/s. The behaviour of $NaNO_2$ is to be compared with that of KNO_3 where there is also no hydrogen. The ferroelectricity and the transition appears to be connected with ordering of the NO_2 groups. There are 9 figures.

ASSOCIATION: Institut kristallografii AN SSSR (Institute of Crystallography AS USSR)
SUBMITTED: May 5, 1962
Card 2/2

S/070/63/008/002/014/017
E039/E435

AUTHORS: Sonin, A.S., Zheludev, I.S.

TITLE: The dielectric properties of $CsNO_3$ single crystals

PERIODICAL: Kristallografiya, v.8, no.2, 1963, 285-287

TEXT: The single crystals used are grown from a melt. $CsNO_3$ crystals are cleavable along the (0001) plane and this facilitates the orientation of samples. This is verified by means of the Laue X-ray diffraction method. Measurements of the dielectric constant are made in directions perpendicular and parallel to the third order axis (ε_c and ε_a respectively). Samples 1 mm thick are used with silver coatings for electrodes. The dependence of the dielectric constants ε_c and ε_a on temperature are measured. At room temperature using 500 kc/s $\varepsilon_c = 8.8$ and $\varepsilon_a = 9.4$. These values increase with temperature and the anisotropy decreases to a negligible value at 140°C. At 154°C there is a phase change which results in a sharp jump in ε from 11.8 to 12.3. In addition, there is a sharp increase in the electrical conductivity. Above and below this transition the electrical conductivity follows the law $\sigma = \sigma_0 \cdot \exp(-W/T)$. The dependence of the piezoelectric modulus d_{33} on temperature is

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The dielectric properties ...

also investigated. At room temperature $d_{33} = 1.4 \times 10^{-8}$ cgsu, decreasing rapidly with increase in temperature until at 125°C it is too small to measure. Preliminary measurements are also made on $RbNO_3$. There are 3 figures.

ASSOCIATION: Institut kristallografii AN SSSR
(Institute of Crystallography AS USSR)

SUBMITTED: May 5, 1962

Card 2/2

SONIN, A.S.; ZHELUDEV, I.S.

Isomorphism and ferroelectric properties. Rost krist. 4: 203-208 '64. (MIRA 17:8)

L 36341-65 EWG(j)/EWA(k)/FBD/EWT(l)/EPA(s)-2/EWT(m)/EEC(k)-2/EEC(t)/T/EWP(t)
EEC(b)-2/EWP(k)/EWP(b)/EWA(m)-2/EWA(h)/EWA(c) Pn-4/Po-4/Pf-4/Pt-10/Peb/Pi-4
ACCESSION NR: AP5008474 Pi-4 IJP(c) WG/JD/JG S/0070/65/010/002/0255/0256

AUTHOR: Filimonov, A. A.; Lomova, L. G.; Suvorov, V. S.; Pakhomov, V. I.; Sonin, A. S.

TITLE: Second harmonic generation in potassium iodate monocrystals

SOURCE: Kristallografiya, v. 10, no. 2, 1965, 255-256

TOPIC TAGS: laser, ruby laser, nonlinear optics, harmonic generation, second harmonic, potassium iodate, nonlinear effect, optical harmonic

ABSTRACT: A second harmonic generation in crystals of potassium iodate illuminated by a ruby laser emission (λ = 6943 Å) is reported. Maximum generation was in the [102], [120], and [012] directions and was of the same order of magnitude as that observed in ADP crystals in the direction of matching indices. The determination of the direction of matching indices in KIO_3 crystals was difficult because of low crystal symmetry and the difficulty of measuring refraction indexes. The minimal refraction indexes for the D_{Na} line with laser emission propagation in the [100], [010] and [011] directions were 1.7281, 1.7274, and 1.7278, respectively. The KIO_3 crystals exhibited high birefringence. It was determined from absorption spectra that the crystals were transparent between 0.4 and 6.2 μ. [CS]

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SONIN, A.S.; ZHELUDEV, I.S.

Dielectric properties of boracite single crystals. Kristallografiia 8 no.2:283-285 Mr-Ap '63.

Dielectric properties of cesium nitrate single crystals. (MIRA 17:8)
Ibid.:285-287

1. Institut kristallografii AN SSSR.

LOMOVA, L.G.; SONIN, A.S.

Changes in the optical indicatrix of triglycine sulfate single crystals in phase transitions. Kristalografiia 10 no.2:251-252 Mr-Ap '65. (MIRA 18:7)